BIOMARKERS OF OXIDATIVE STRESS IN CLINICAL STUDIES

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Abstract

Measurement of biomarker levels in human biofluids may be a practical approach to assess oxidative stress status (OSS). Many biomarkers for OSS have been reported in the literature including antioxidants, antioxidative enzymes, isoprostanes, malondialdehyde, alkanes, oxidized LDL, lipid peroxides, and 8-oxodeoxyguanosine. This presentation presents the results for two biomarkers evaluated in our clinical studies and data from the literature on other potentially useful biomarkers. A serum Total Antioxidant Capacity (TAC) assay based on copper (II) reduction by the antioxidants was adapted from a commercial kit assay and used in a cross-over, short-term exposure study on a test cigarette. The results showed that there was no significant change in TAC levels in serum samples of the subjects who switched from smoking Marlboro Lights to test cigarettes or to abstinence from smoking. It is not clear at present whether this result is due to the insensitivity of the assay or possible artifacts during serum preparation. TAC will be reevaluated in the future studies when a more sensitive assay for plasma becomes available. In another study (a Pilot Total Exposure Study), 8-*epi*-$PGF_{2\alpha}$ ($iPF_{2\alpha}$-III), a biomarker for lipid peroxidation, was measured in urine in 72 adult smokers and 68 non-smokers. Urinary 8-*epi*-$PGF_{2\alpha}$ levels were not only significantly higher in smokers than in non-smokers, but also appeared to correlate to the number of cigarette smoked by the smokers. Recently, it has been reported that as compared to 8-*epi*-$PGF_{2\alpha}$ ($iPF_{2\alpha}$-III), $iPF_{2\alpha}$-VI is a more specific biomarker for lipid peroxidation and more abundant in human urine, suggesting it would be a very useful biomarker in clinical studies. Literature data suggested that antioxidative enzymes are also potentially useful biomarkers for OSS.

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